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CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN IL F/G 5/9
THE JOB ACTIVITIES DESCRIPTION (JAD) QUESTIONNAIRE: AN ANALYSIS--ETC(U)
SEP 79 R L ELLISON, C ABE, D G FOX

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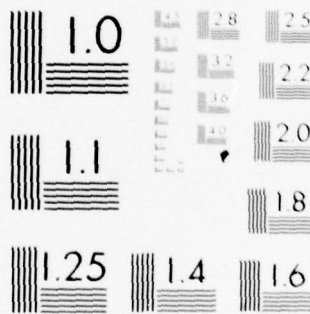
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INTERIM REPORT E-157
September 1979

Indicators to Predict Managerial Performance
in Military Construction

THE JOB ACTIVITIES DESCRIPTION QUESTIONNAIRE:
AN ANALYSIS OF TIME SPENT ON AND
IMPORTANCE OF MANAGERIAL DUTIES

12 LEVEL II

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CERL-IR-E-157	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) THE JOB ACTIVITIES DESCRIPTION (JAD) QUESTIONNAIRE: AN ANALYSIS OF TIME SPENT ON AND IMPORTANCE OF MANAGERIAL DUTIES.	5. TYPE OF REPORT & PERIOD COVERED INTERIM rept.	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR Robert L./Ellison, Clifford/Abe, David G./Fox Wayne D./Veneklasen	8. CONTRACT OR GRANT NUMBER(s) 4A761102AT23-A1-007	9. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 4A761102AT23-A1-007
10. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. ARMY CONSTRUCTION ENGINEERING RESEARCH LABORATORY P.O. Box 4005, Champaign, IL 61820	11. CONTROLLING OFFICE NAME AND ADDRESS 11A1	12. REPORT DATE Sep 1979
13. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	14. SECURITY CLASS. (of this report) Unclassified	15. NUMBER OF PAGES 43
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Copies are obtainable from National Technical Information Service Springfield, VA 22151		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) personnel management Army Corps of Engineers manpower utilization job analysis		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The Job Activities Description (JAD) was administered to 394 U.S. Army Corps of Engineers employees at GS levels 11 through 16 to examine the nature of job activities for these personnel. The JAD focused on management practices that were generally characteristic of key positions within the Corps. Personnel at the lower levels (GS 11 and 12) spend much more time in Use Knowledge and Skills in a Technical Capacity--those activities for which an		

Block 20 continued.

↙ engineer is trained. Personnel at these levels can remain specialists. Personnel at higher levels (GS 15 and 16) spread their time over all nine of the categories studied, thus assuming the role of a manager and generalist, so that engineering duties become less important.

This study resulted in a better understanding of the job activities rated as being of greater importance at the managerial levels of the Corps. The analyses indicated that the selection process should concentrate on an applicant's ability to perform those duties required at the higher level--not on past demonstrated ability in activities that may not be relevant at the higher level.

↖ The information obtained in this study can facilitate the process of selecting/promoting the most effective individuals into managerial positions in the Corps of Engineers. Managerial positions do differ in what activities are important, and these differences should be used in the selection and training process.

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FOREWORD

This research was conducted for the Directorate of Military Programs, Office of the Chief of Engineers (OCE), under Project 4A761102AT23, Task A1, Work Unit 007, "Indicators to Predict Managerial Performance in Military Construction." The applicable QCR is 3.04.005. The OCE Technical Monitor for this study was John J. Sheehey, DAEN-MPP-P.

The work was performed for the U.S. Army Construction Engineering Research Laboratory (CERL) by The Institute for Behavioral Research in Creativity (IBRIC), 1570 South Eleventh East, Salt Lake City, Utah. IBRIC researchers were Dr. Robert Ellison, Dr. Clifford Abe, and Mr. David G. Fox. Principal Investigator at CERL was Dr. Wayne D. Veneklasen. Program review of the work and report was provided by Mr. Richard G. Donaghy, Chief of the Energy and Habitability Division, CERL.

Appreciation is expressed to Ms. Karen Ellison of IBRIC for her invaluable assistance with this report. Appreciation is also expressed to those 459 Corps personnel across the country who took the time and care to complete and return the JAD forms.

COL James E. Hays is Commander and Director of CERL and Dr. L. R. Shaffer is Technical Director.

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THE JOB ACTIVITIES DESCRIPTION (JAD) QUESTIONNAIRE:
AN ANALYSIS OF TIME SPENT ON AND IMPORTANCE OF
MANAGERIAL DUTIES

1 INTRODUCTION

Background

Concern about the development of effective personnel selection and promotion procedures has been characteristic of Army Corps of Engineers personnel policies for many years, but only recently have substantial efforts been made to develop and evaluate procedures for identifying and developing managers early in their Corps careers. This research builds upon a recently completed preliminary study¹ on the development and assessment of performance indicators to assist in the selection of individuals for managerial positions. The earlier study was designed to identify and explore performance indicators that could potentially be used in the identification and selection of top level managers within the Corps. One comment obtained in an interview during the study illustrates the importance of making accurate selection decisions:

The single most important thing a manager can do is select people. If other than competence and potential are the basis for a selection decision, a mistake can last as long as 30 years.

While one selection mistake can last the remainder of that individual's career, the total impact of that error can be even more debilitating, as indicated in another interview:

An ineffective or inefficient manager will not generally select supervisors that will be better than he is--they will make him look as bad as he really is. Then those supervisors will select their personnel in the same way and that entire organization is crippled by one bad management selection decision.

The major portion of the Corps of Engineers is divided into 10 Divisions which are subdivided into 37 Districts. At these organizational levels, there are approximately 200 key managers who determine the quality of the Corps. Under these key personnel are approximately 600 second and third level supervisors, all of whom have substantial

¹ Performed for CERL under contract DACA88-77-C-0004.

managerial responsibility. Including the other Corps elements (Office of the Chief of Engineers and the Field Operating Agencies), the total number of supervisory and managerial personnel is well over 1,000. This group of supervisors and managers is largely responsible for the execution of the Corps' annual program involving the management of billions of dollars of construction and operations and maintenance projects each year. Any personnel selection mistake can therefore have very serious implications not only for individual management styles, productivity, and subordinate employees, but also for the accountability for individual portions of the Corps budget. The costs of selection errors are potentially staggering and the Corps' concern for minimizing selection errors is very realistic.

A number of selection, placement, and promotion methods have been used by the Corps to select its most promising candidates for promotion into supervisory and managerial roles. The Federal Personnel Manual, Civilian Personnel Regulations, Engineer Regulations, and the Supervisor's Personnel Handbook all provide guidance for selection and promotion. Promotion and placement methods are outlined in FPM 335-1² and ER 690-1-335³. These guidance documents are primarily methods-oriented but do not define or establish qualification criteria. The most recent step in this direction was the development and implementation of the Skills, Knowledge, Ability, and Personal Characteristics (SKAP) Program, CPR 950-1⁴, which is the system for rating individuals for qualification for promotion via DA Form 4428-R⁵, DA Form 2302⁶, and ENG Form 4685-R (OT)⁷. These ratings are then reviewed by an ad hoc panel or higher GS level personnel.

The problem with the SKAP ratings is common to all rating systems--lack of objectivity. When the review panel examines all the completed rating forms for a group of candidates, the panel members have no frame of reference for how the ratings were made, and the ratings are accepted at face value. In turn, the raters are aware that the candidate must appear qualified to be considered for promotion. They also "know" that other raters will make their candidates look good on paper by giving high ratings, and the desire to make one's candidate competitive replaces objectivity on the part of the raters. This problem is further

² Promotion and Internal Placement, FPM 335-1 (Civil Service Commission, 23 August 1973).

³ Merit Promotion and Related Placement Program, ER 690-1-335 (Department of the Army, Office of the Chief of Engineers, 15 August 1978).

⁴ Career Management, CPR 950-1 (Department of the Army, 1 November 1977).

⁵ Army Civilian Career Program for Engineers and Scientists (Resources and Construction (LRA)), DA Form 4428-R (Department of the Army, 1 September 1975).

⁶ Qualification Record-Civilian Personnel, DA Form 2302 (Department of the Army, 1 October 1975).

⁷ Career Referral Work Sheet, ENG Form 4685-R (OT) (Department of the Army, 1 June 1978).

compounded by the necessity of discussing a candidate's ratings with him/her. Discussing moderate or high ratings is easier than justifying a low rating to the candidate. Forms completed by the applicant are also subject to distortion. In the words of one interviewee: A GS 7 can make himself look like he built Cape Kennedy single-handedly.

Another drawback of the SKAP program is that the categories emphasize the evaluation of job traits and provide no information about job duties. So, while this information may be important in evaluating individuals, the rating process is fairly subjective and provides no information relevant to the job itself. Determining the job requirements and then matching them to the individual's traits during the selection process is still necessary.

The Job Activities Description (JAD) described in this report represents a part of an extensive research effort to determine potential performance indicators which could be used in the selection process. The rationale underlying the JAD was that a better understanding of the important job activities at each management level would contribute to more effective selection procedures. Empirical descriptions of differences in job duties across management levels have not been previously available. By examining the job activities at each management level within the Corps, the job requirements important for an individual to function competently at the various levels could be determined. The same procedure could be used to define the characteristics of a particular position so the selecting official(s) could make a more informed selection.

The preliminary work with the JAD was directed at engineers in GS grades 11-15 at three Corps District offices. Development of the categories and job activities within each category did not imply that engineers cannot or do not contribute to the effectiveness of the organization in other ways, but simply that the JAD has reasonably global categories that have some explanatory value in selecting, training, and evaluating competence in management performance.

Results obtained from the 377 engineers indicated strong relationships between GS level and the rated importance of job activities. Higher level managers, for instance, spent more time engaged in activities related to the training and motivation of personnel than did GS 11s and reported that these activities are of much greater importance to their job.

Findings from the first study were somewhat limited in that only a small number of higher grade level personnel were included. In addition, the study pointed the way toward some important design revisions. In the form reported here, the JAD time scales were revised and a somewhat different set of activities within categories was used. Once the JAD is validated and proven reliable, information obtained through its use could be used to help establish managerial job profiles for various GS grade levels. The remaining parts of the selection

process using current procedures, e.g., the SKAP ratings and possible new techniques (the Management Audit Survey, interview techniques, a biographical inventory, etc.) will be developed in future work.

Objectives

The general goal of the current research was to determine the possible utility of the refined JAD for supplementing current personnel selection procedures. The JAD would define what kinds of activities are important for success in higher level jobs and how they differ from jobs at the journeyman level of GS 11. Specifically, the objectives of the study were to:

- ascertain the differences in time spent on selected job activity categories by different levels of management;
- determine the relative importance of selected job activities across different levels of management; and
- examine various job classifications for any differences in selected job activities.

Approach

The three phases planned for accomplishing the objectives were (1) refine the preliminary JAD form by examining the field development studies; (2) field test the revised JAD form using a sample of 650 Corps personnel in GS grades 11-16; (3) analyze the completed forms to determine the amount of time spent on and rated importance of designated managerial duties by grade level.

2 PROCEDURE

This chapter on data collection describes how the JAD was developed, characteristics of the sample, and the data processing procedures followed.

Form Development

The JAD benefitted substantially from previous research, having been constructed on the basis of research reported by Hemphill⁸ and Mahoney⁹. These studies and others, such as the early work by Flanagan¹⁰ on critical incidents, focused principally on the many different kinds of activities of managers, and how jobs differ within and across organizations. Obviously, a number of different, complex activities are characteristic of managerial positions, and these early studies documented this complexity. Such studies have important implications for training and for assessing job performance, since they indicate that competent managers must have a great variety of skills and abilities. These studies, however, did not indicate how managerial positions should be evaluated and did not describe the nature of managerial positions at different levels of the organization. Also, no information was available on how Corps managers may be different from managers in other organizations.

For the first form of the JAD, 10 categories of job behaviors were selected on the basis of the earlier research and interview results as being relevant to Corps activities. Within each of these 10 categories, at least three specific job behaviors were included to get at the actual nature of what Corps managers do. Different levels of managers evaluated their jobs on each of these behaviors by indicating the amount of time spent on each activity and the degree of importance each activity had for success in their particular position. The results indicated that very few differences existed in time spent across different levels of management. Such findings have typically characterized other research studies as well, e.g., Hemphill¹¹. Of more value were the

⁸ J. K. Hemphill (Ed.), The Engineering Study (Princeton Educational Testing Service, 1963).

J. K. Hemphill, "Job Descriptions for Executives" Harvard Business Review, Vol. 37, (1959), pp. 55-67.

⁹ T. A. Mahoney, Criteria of Organizational Effectiveness, Mimeographed report (University of Minnesota, Industrial Relations Center, 1966).

¹⁰ J. C. Flanagan, The Critical Incident Technique. Psychological Bulletin, Vol. 51, (1954), pp. 327-358.

¹¹ J. K. Hemphill (Ed.), The Engineering Study.
J. K. Hemphill, "Job Descriptions for Executives."

perceptions of relative importance of specific job activities of the different levels of management.

This previous study had a limited sample of higher level management personnel, particularly those at GS levels 15 and 16. In addition, further refinements were made in the design of both the categories and the specific job activities presented on the JAD form. These changes were made to improve the relationship between the categories and the different managerial levels, and to improve the sensitivity of the instrument to these different levels.

One concern in the design of the JAD was the provision of appropriate items so that the lower GS level personnel could describe their positions by the amount of time spent and the importance of the particular job activity. In some cases, including these lower level job activities was counter to the purpose of the questionnaire, i.e., defining the job activities of higher level managers. However, excluding the categories through which lower level personnel could describe their positions would have been detrimental to the study and to the form. Thus, a number of job activities were written which were more characteristic of lower level personnel to provide an opportunity for these positions to be described, and, thus, enable differences to be obtained between these positions and the higher level positions.

Table 1 presents the revised form of the JAD used in the current study. The measurement of time spent was requested only for the more generic categorizations of job activities. In previous research and in the first JAD study, estimates of the percentage of time spent on the specific job activities were so small that accurate measures were difficult to obtain. A higher level abstraction would provide more valuable data on time spent.

On the other hand, previous research with the JAD had demonstrated that the more specific the statement of the actual job activity, the more likely that the statement would differentiate between different levels of management performance. Thus, the specific job activities were rated for their importance for job success as in the previous form. This general format for collecting such data has the advantage of both relative simplicity and, as the results will reveal, sensitivity to describe aspects of a management position within the Corps of Engineers.

Data Collection

Although having the same number of individuals in each of the GS levels would have been desirable, certain difficulties were encountered during the course of the study that made this not feasible. A sample was originally requested for GS 11s through GS 16s, and, because of the limited number of GS 15s and 16s, all personnel at these high management levels were to participate in the study to provide relatively stable

Table 1

Job Activities Description

The Job Activities Description will provide information about the kinds of activities that are required by certain positions within the Corps. The data will be very valuable in helping to define and understand the kinds of activities that are carried out by key Corps personnel. Ultimately, the information from this form will contribute to the future selection and placement of personnel into key managerial positions. Your cooperation in completing the form is greatly appreciated.

All data will be treated confidentially and anonymously. The information you provide in the section below will aid in the effective use of the data provided on the back of this page.

-
1. G. S. level _____
 2. Years of professional experience _____
 3. Current job title _____

Please indicate if you have had two or more years of experience in each of the following areas by marking yes or no on the line following each area. Please circle the number of the area in which you are presently working.

4. Civil Works _____
 5. Military Construction _____
 6. Engineering _____
 7. Planning _____
 8. Construction _____
 9. Operations _____
 10. Other _____
-

The back of this page is a form for providing information about the kinds of activities which are important for a person in your job. For each activity listed, please:

(a) use the scale on the left to indicate the approximate percent of time that you spend in each major category of activity printed in capital letters. For example, if you spend about 7% of your time in activities which could be classified under INTERACT WITH OTHER ORGANIZATIONS, you should write 7 in the blank to the left of that category. These percentages will not total 100, since some activities overlap and others are omitted.

(b) use the scale on the right to indicate how important it is for a person in your job to perform adequately in the specific activities within each category. For example, if "Organize work schedules" is a crucial job activity, write a 5 in the space to show this. When rating the activities, disregard the percent of time you have just indicated and how hard it may be to do the activity. Please rate all of the specific activities.

Table 1 (Continued)

PERCENT OF TIME	IMPORTANCE				
	Crucial Quite Important Moderate Importance Some Importance Unimportant				
	1	2	3	4	5
REVIEW AND EVALUATE PROJECTS					
Monitor project progress.					
Evaluate productivity measures and systems.					
Review cost accounting records.					
ALLOCATE RESOURCES					
Budget program expenditures					
Allocate resources to projects and programs					
Prepare cost estimates for a project.					
TRAIN AND MOTIVATE PERSONNEL					
Analyze training and developmental needs of subordinates					
Guide personnel assignments and procedures.					
Provide for personnel development and recognition					
INITIATE IMPROVEMENTS IN METHODS AND OPERATIONS					
Develop and/or implement new methods of operation					
Plan and initiate new organizational procedures					
Design new management procedures.					
USE KNOWLEDGE AND SKILLS IN A TECHNICAL CAPACITY					
Solve various engineering and scientific problems					
Prioritize system requirements and objectives					
Act as consultant for solving technical problems.					
INTERPERSONAL INTERACTION					
Help others resolve differences					
Stimulate cooperation among employees					
Provide feedback to subordinates about job performance					
INTERACT WITH OTHER ORGANIZATIONS					
Negotiate with outside organizations.					
Develop cooperative relationships with clients, interest groups, etc.					
Keep up with current events through contacts with outsiders.					
SCHEDULE WORK OF ORGANIZATIONAL COMPONENTS					
Organize activities of others to respond to problems.					
Organize work schedules					
Establish project priorities.					
LONG-RANGE PLANNING AND CONTROL					
Participate in long-range planning meetings					
Investigate possible future developments and response options.					
7/78 Develop long-range priorities					

estimates of the managerial job at these levels. The participants from GS 11 through 14 were randomly selected from the Corps Stratification Tape at the OCE Manpower Office. All Corps GS 15s and 16s in the United States were asked to participate. All data were collected anonymously by mail, with only one request for completion and return of the forms.

The final sample selected and analyzed during the study is described in Table 2. As shown in this table, the percentage returned and the absolute sample size is somewhat low for two of the GS levels-- 11 and 16. More adequate return rates were obtained for the levels where the individual enters into and is promoted up the managerial ladder, i.e., GS 12 through GS 15. Since the forms came from essentially all U.S. Divisions and Districts within the Corps, the data should be generally representative of managerial positions within the Corps, although some caution is justified in interpreting the results, because of the moderate return rate.

Data Analysis

The data analysis procedures followed in the study were relatively simple. Upon receipt of the data, all information was keypunched and mean scores for each time category were computed for each GS level. These mean scores were then compared to determine what differences, if any, were characteristic of the different GS level positions. These data were analyzed with an analysis of variance (ANOVA) program to determine the significant differences between the mean percent of time reported by the different managerial levels.

A similar procedure was followed for the importance ratings of the various job activities. The mean importance ratings were computed for each GS level and these were compared for significant differences by the ANOVA program. In addition, some comparisons were made of certain job titles and of current job area (e.g., Civil Works, Military Construction, Engineering, Construction, etc.).

Table 2
Description of the Sample

<u>Job Level</u>	<u>Number Distributed</u>	<u>Number Processed</u>	<u>Percent Returned*</u>
GS 11	80	44	60
GS 12	84	65	83
GS 13	79	54	82
GS 14	70	49	86
GS 15	272	162	69
GS 16	<u>58</u>	<u>20</u>	<u>41</u>
TOTAL	643	394	71

*This column includes data received too late to be processed.

3 RESULTS

The Managerial Job--An Analysis of Time Spent

The instructions for the JAD advise the participant that not all aspects of managerial jobs would be included on the form, and that the various job activities were not necessarily independent (e.g., Interpersonal Interaction overlaps with Train and Motivate Personnel). Nevertheless, the different categories of job activities do provide important information about how Corps personnel spend their time. The results for this part of the study are presented in Table 3, which shows the average percent of time spent by each of the GS levels on each of the major job categories included within the JAD. For example, Category 1--Review and Evaluate Projects--was responded to similarly by all levels of managers studied. The average time spent on these kinds of activities varied from 14 to 18 percent, and there were no significant differences among the managerial levels as determined by the ANOVA test.

Somewhat similar results were obtained for category 2--Allocate Resources. This category had a smaller percent of time devoted to it as the average time estimates ranged from 7 to 12 percent.

The different levels of management did describe their jobs differently on the third category of job activities--Train and Motivate Personnel. The mean percent of time spent on activities in this category varied from 4 percent for GS 11 personnel to 12 percent for GS 16s. These results indicate the gradually increasing scope of this activity as one proceeds up the managerial ladder. A common complaint obtained in the early interview results from the previous study was that many managers are still trying to perform engineering duties and are not willing to deal with other key aspects of their jobs, e.g., training and motivating personnel.

Significant differences were also obtained on how much time different levels of management spent on the next category within the JAD--Initiating Improvements in Methods and Operations. Although the differences were not marked, ranging from only 7 to 11 percent, they were statistically significant at the .01 level (i.e., the differences between means could be obtained by chance only 1 time in 100).

The category which took up the most time of Corps personnel was the Use of Skills and Knowledge in a Technical Capacity. The average GS 11 reported that he/she spent approximately 38 percent of his/her time on these kinds of job activities. By the time managers had reached the GS 16 position, only 13 percent of their time was spent on these activities. These results indicate the declining amount of time spent using technical skills as an individual is promoted up the managerial ladder.

Table 3
Percent of Time Spent on Different Job Activities
Across GS Levels

Job Activity Category	Significant	Average Percent of Time Spent At Each GS Level					
		11	12	13	14	15	16
1. Review and Evaluate Projects	No	14	14	16	18	14	15
2. Allocate Resources	No	7	9	11	9	10	12
3. Train and Motivate Personnel	Yes**	4	7	10	9	10	12
4. Initiate Improvements in Methods and Operations	Yes**	7	7	7	7	11	10
5. Use Knowledge and Skills in a Technical Capacity	Yes**	38	41	28	20	21	13
6. Interpersonal Interaction	Yes*	10	10	9	12	14	15
7. Interact with Other Organizations	No	15	13	14	12	14	17
8. Schedule Work of Organizational Components	Yes*	6	11	12	12	10	11
9. Long-Range Planning and Control	Yes**	3	5	6	8	10	13

*p < .05

**p < .01

Job activity category 6--Interpersonal Interactions--was significant at the .05 level. Higher level managerial personnel tended to spend more time in interpersonal interactions.

Category 7--Interactions with Other Organizations--did not differentiate among the different managerial levels on amount of time spent. The average amount of time spent in interacting with personnel from other organizations varied from 12 to 17 percent.

Category 8--Scheduling Work of Organizational Components--required only a relatively small amount of time across all managerial levels, ranging from 6 to 11 percent. These differences in how managers at the various levels spent their time on this category were significant at the .05 level.

The final category--Long-Range Planning and Control--was an area which took up very little time of the GS 11s (3 percent), but an increasing amount of time as one progressed up the managerial ladder. At the GS 16 level, approximately 13 percent of the time spent was on these kinds of activities. The results were highly significant in differentiating among managerial levels.

Despite differences in how managers at the various levels spend their time, generally comparable results were obtained for each of the GS levels on the total amount of time spent across the JAD categories. The total amount of time accounted for by the JAD for the GS 11s was just over 100 percent and slightly over 119 percent for the GS 16s. That these were greater than 100 percent reflects the fact that many of the job categories concerned somewhat related or overlapping job activities.

The Importance of Job Activities According to GS Level

In this part of the results, the mean importance rating was computed for each GS level on each of the separate job activities. These means were then analyzed to see if they were significantly different. The results are reported as eta coefficients to express the degree of relationship between the importance rating and the GS level (i.e., a high relationship indicates that the measure differed by GS level). The eta coefficient is particularly well suited for this kind of analysis since it has no assumptions with regard to the distributions and describes relationships even though they may not be linear.

Figure 1 presents the results for the first category of job activities--Review and Evaluate Projects. The first job activity, "monitor project progress," was rated higher in importance by GS levels 13 through 16 and lower in importance by GS 11s. With the sample sizes and standard deviations obtained for these categories, a difference of approximately .5 in the mean importance rating for any two GS levels would generally be significant. The overall results for comparing the mean differences on this job activity were clearly significant

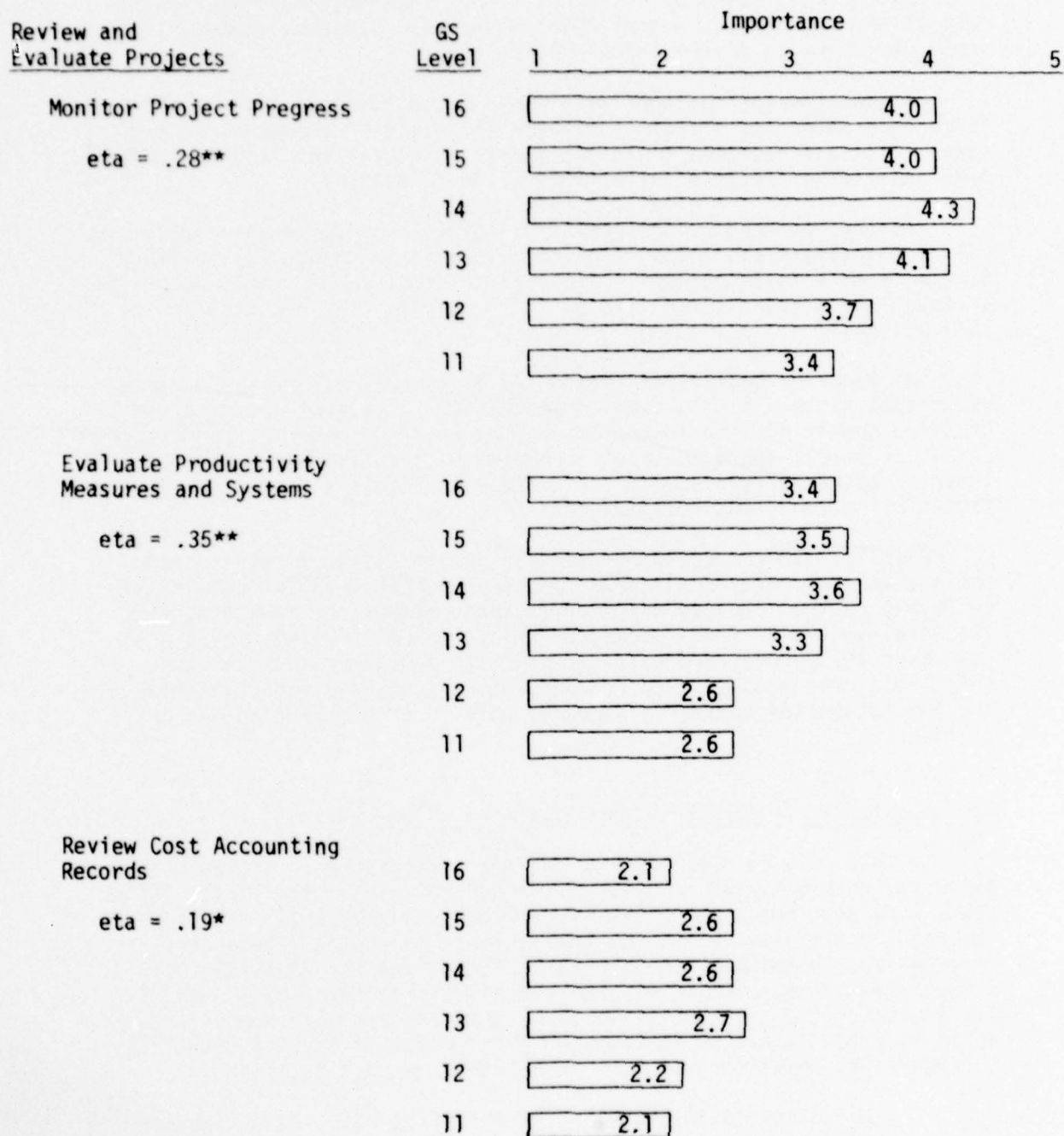


Figure 1. Rated Importance of Review and Evaluate Projects Activities by GS Level (**p < .01; *p < .05)

statistically. Thus, monitoring project activities was more important for the higher level managerial positions.

Somewhat similar results were obtained for the other two job activities in this category, although their overall rated importance was not as high. The activity "evaluate productivity measures and systems" was more important for the higher GS level jobs than for the 11s and 12s, and "review cost accounting records" was more important for the mid-level management positions and not for the GS 11s, 12s, or 16s.

Figure 2 presents the rating of importance of job activities in the Allocate Resources category by GS level. Marked differences were obtained for the activities in this category as higher levels of management rated these job activities, "budget program expenditures" and "allocate resources to projects and program," as more important. The differences in the importance of these job activities were quite marked. A marked reversal occurred on the "prepare cost estimates for a project" which was considerably more important for the lower GS levels than for the higher level positions.

Figure 3 presents the importance of job activities within the category of Train and Motivate Personnel. Highly significant (.01 level) results were obtained for all three of these job activities in distinguishing between different levels of managerial performance. Higher level managers did report that these kinds of activities were more important for successful job performance than did the lower GS level personnel. The differences between GS 13 through 16s were typically trivial, but obviously skills and competence in this area should be a prerequisite for selection of employees into managerial positions, but not a factor in distinguishing between levels GS 13 through 16.

Figure 4 presents the results for the activities dealing with Initiate Improvements in Methods and Operations. Again, all three activities were significantly related to GS level. The activity "design new management procedures" was most sensitive to differences in GS level. This category of activities has been discussed by various management theorists as being crucial for the survival of an organization. These results generally support the theory, since the higher level managers do view this activity as important, but the importance ratings are not as high as for some other categories. How the importance of these job activities would change across time or across organizations is a matter of conjecture.

Figure 5 presents the results obtained for those activities dealing with Using Knowledge and Skills in a Technical Capacity. Generally speaking, these activities were not as highly discriminating in describing management activities as categories described previously, but all three activities in this category were statistically significant. "Solving engineering and scientific problems" was viewed as much more important by lower level personnel than by individuals at the GS 15 and 16 level, where it was only accorded moderate importance. The results

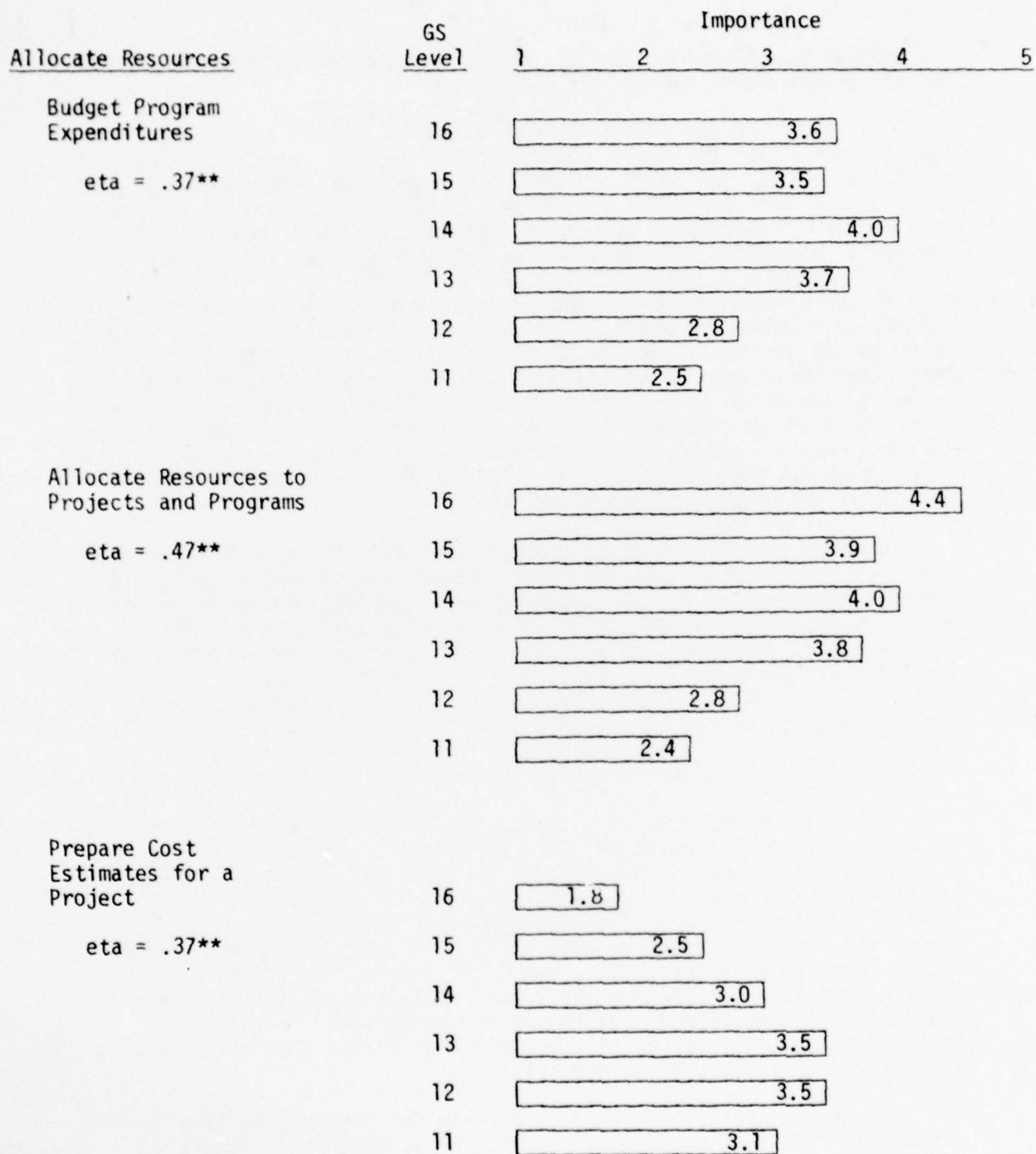


Figure 2. Rated Importance of Allocate Resources Activities by GS Level (**p < .01)

Train and Motivate Personnel	GS Level	Importance				
		1	2	3	4	5
Analyze Training and Developmental Needs of Subordinates	16	3.6				
eta = .32**	15	3.6				
	14	3.8				
	13	3.7				
	12	3.1				
	11	2.6				
Guide Personnel Assignments and Procedures	16	3.7				
eta = .36**	15	3.9				
	14	3.8				
	13	3.7				
	12	3.3				
	11	2.6				
Provide for Personnel Development and Recognition	16	4.1				
eta = .43**	15	4.0				
	14	3.9				
	13	3.9				
	12	3.0				
	11	2.7				

Figure 3. Rated Importance of Train and Motivate Personnel Activities by GS Level (**p < .01)

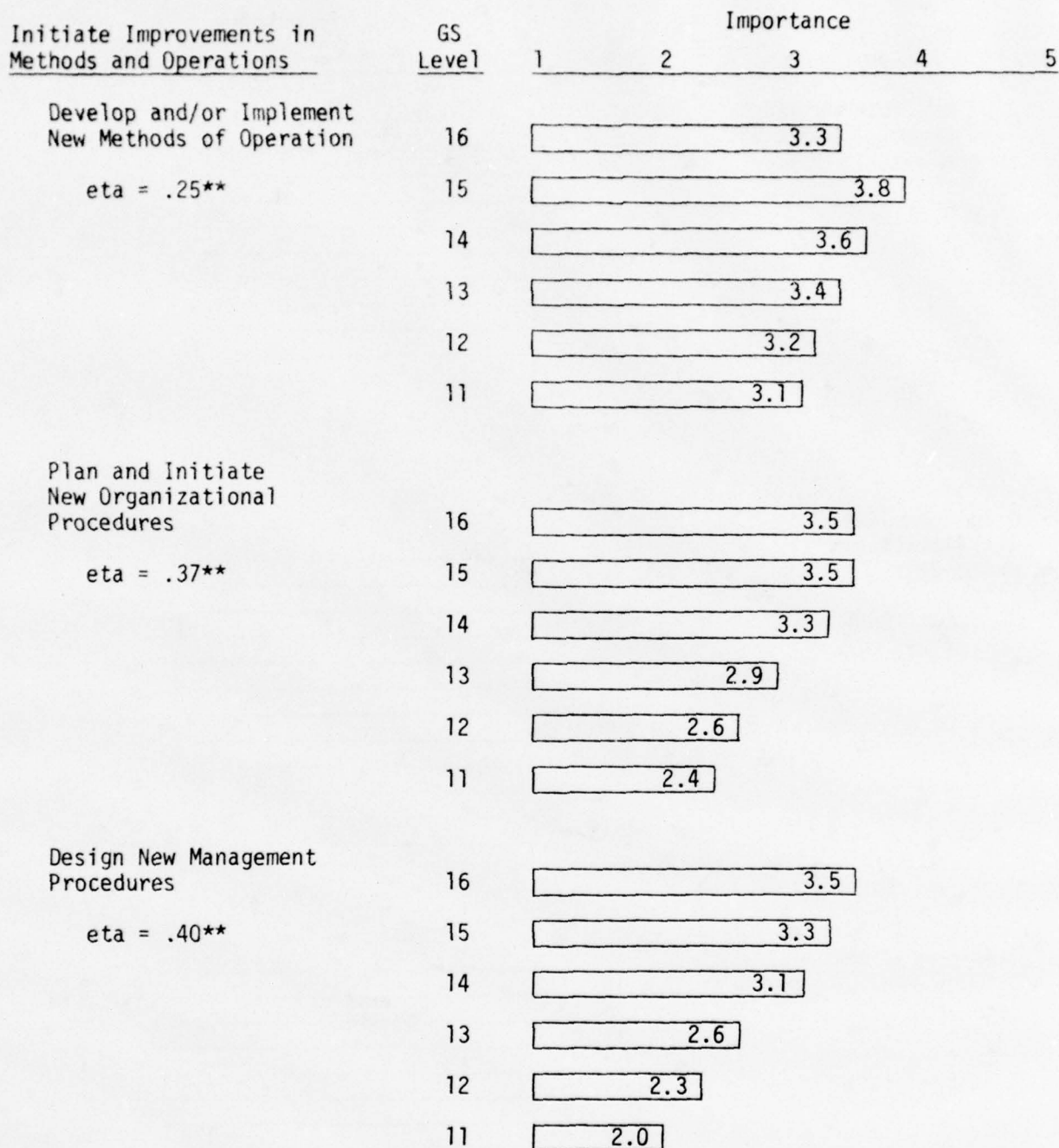


Figure 4. Rated Importance of Initiate Improvements in Methods and Operations Activities by GS Level (**p < .01)

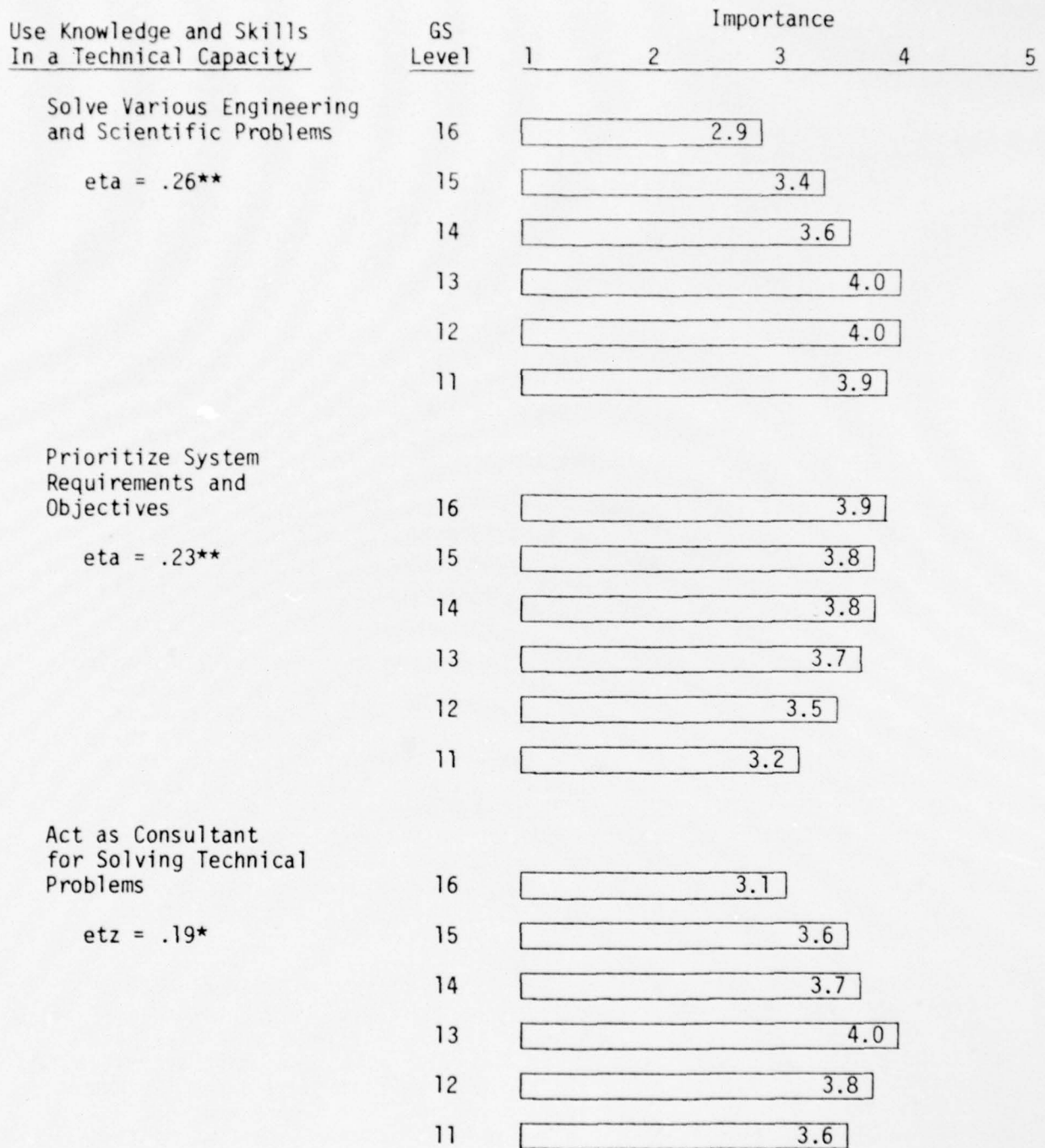


Figure 5. Rated Importance of Use Knowledge and Skills in a Technical Capacity Activities by GS Level (*p < .05; **p < .01)

indicate that technical skills have about the same level of importance for GS 11s, 12s, and 13s and then start to decline in importance for successful job performance. "Prioritize system requirements and objectives" was viewed as a highly important activity by the higher levels of management. At lower levels, such activities were viewed at a somewhat lower level of importance. Serving as a consultant in solving technical problems also discriminated in a reverse manner since the higher GS levels reported this as less important than did lower level personnel. Apparently, solving technical problems is a skill which should be considered as important for promotion to the GS 13 level, but accorded less importance thereafter.

Figure 6 presents the results for those activities dealing with Interpersonal Interactions. All three activities in this category were viewed as more important by higher GS level personnel. Thus, developing skills in interpersonal relations is a key component that should be considered in the selection/promotion process. The activity rated highest in importance was "stimulate cooperation among employees," which was rated at 4.4 on the scale by GS 16s. The activity item most sensitive in discriminating different managerial duties was the one dealing with "providing feedback to subordinates about job performance." Although it was of at least moderate importance for all Corps personnel, the managers differed markedly in the extent to which they viewed this as a key element in their job activities.

Figure 7 presents the results obtained for those activities dealing with Interact with Other Organizations. The activities in this category, although consistently rated as important, did not differentiate among different levels of managerial performance. These results, taken at face value, suggest that, for different levels of management, there are no meaningful differences in the importance of interacting with individuals in the external organizational environment. An equally plausible hypothesis is that the results reflect the nature of the activity but not the method or the people involved. Further research could explore such possibilities, since understanding how managers relate to and interact with external organizations would appear highly relevant to successful organizational performance.

Figure 8 presents the activities in the category--Schedule Work of Organizational Components. Here significant results were obtained for two of the activities, those dealing with "organize work schedules" and "establish project priorities." The "organize work schedules" activity was rated more important by GS 13s and 14s, whereas the 11s and 12s and 15s and 16s accorded this activity a lower level of importance. "Establish project priorities" was clearly rated as more important by the GS 16s and, as might be expected, was lower in importance for the GS 11s and 12.

Figure 9 presents the job activities in the Long-Range Planning and Control category. This category contains job activities which were

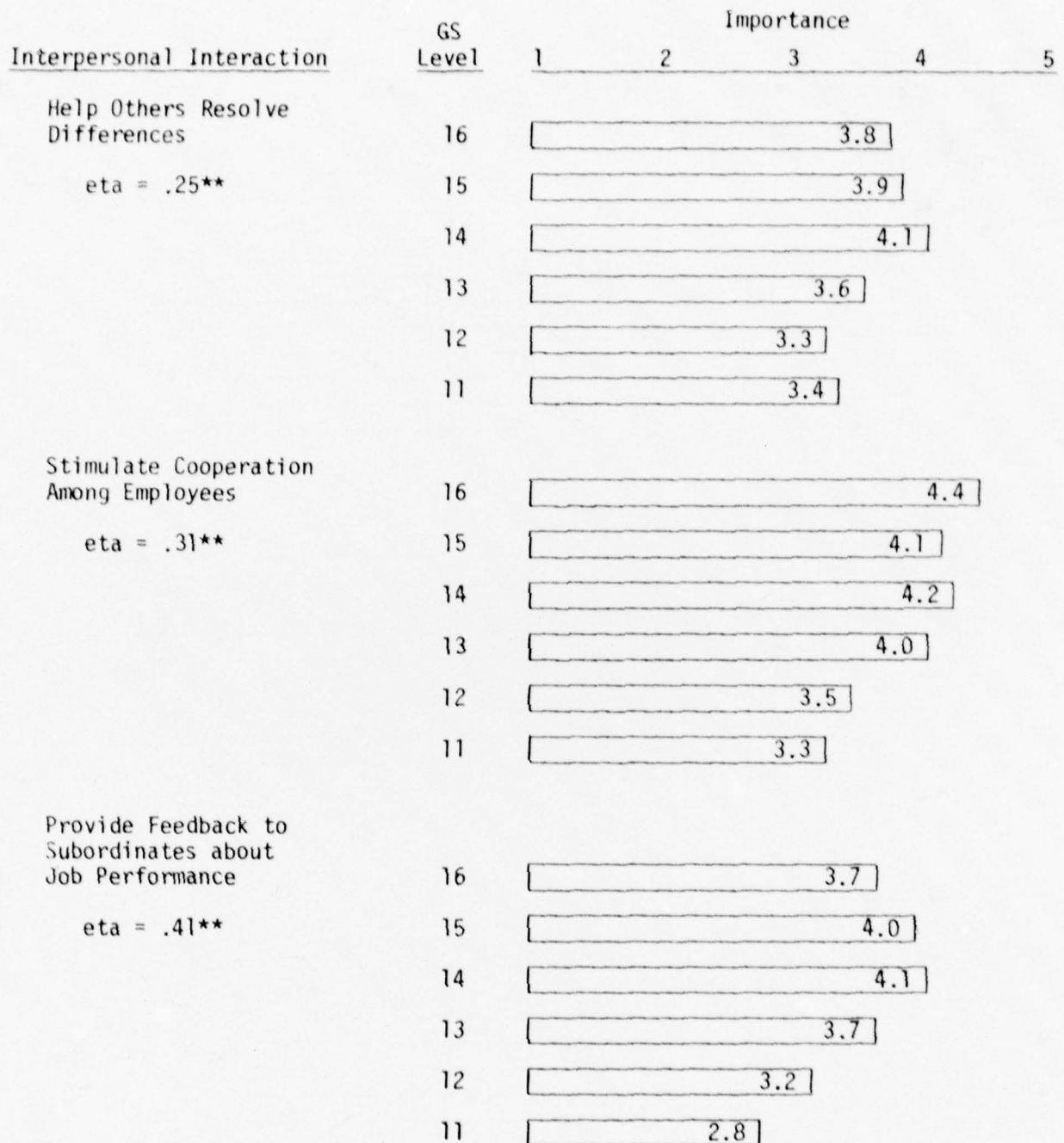


Figure 6. Rated Importance of Interpersonal Interaction Activities by GS Level (**p < .01)

Interact with Other Organizations	GS Level	Importance				
		1	2	3	4	5
Negotiate with Outside Organizations eta = .10	16	3.8				
	15	3.9				
	14	3.9				
	13	3.8				
	12	3.6				
	11	3.7				
Develop Cooperative Relationships with Clients, Interest Groups, etc. eta = .20*	16	4.4				
	15	4.0				
	14	4.2				
	13	4.0				
	12	3.6				
	11	3.6				
Keep Up With Current Events Through Contacts With Outsiders eta = .15	16	3.8				
	15	3.6				
	14	3.4				
	13	3.5				
	12	3.3				
	11	3.3				

Figure 7. Rated Importance of Interact with Other Organizations Activities by GS Level (*p < .05)

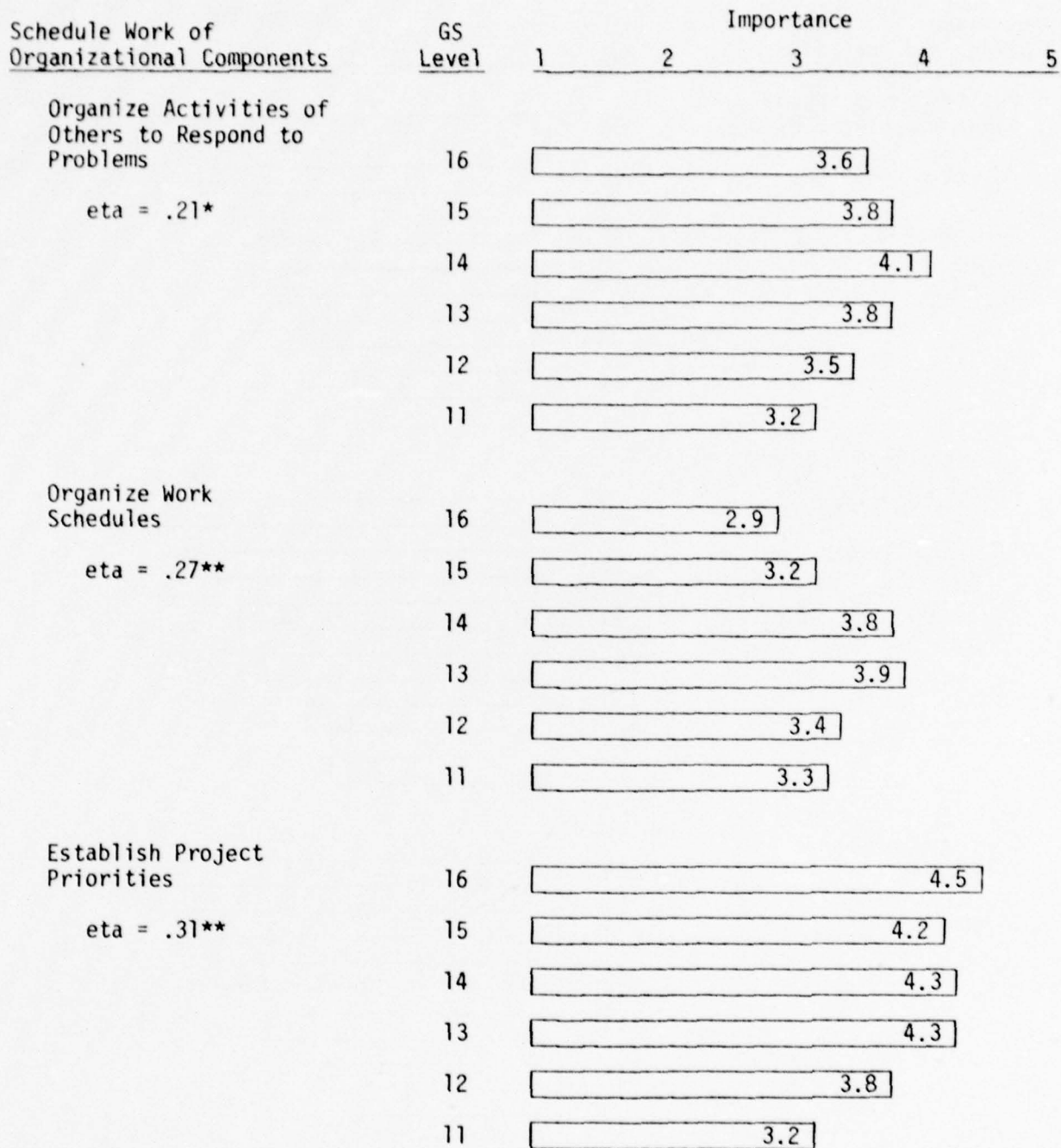


Figure 8. Rated Importance of Schedule Work of Organizational Components Activities by GS Level (*p < .05; **p < .01)

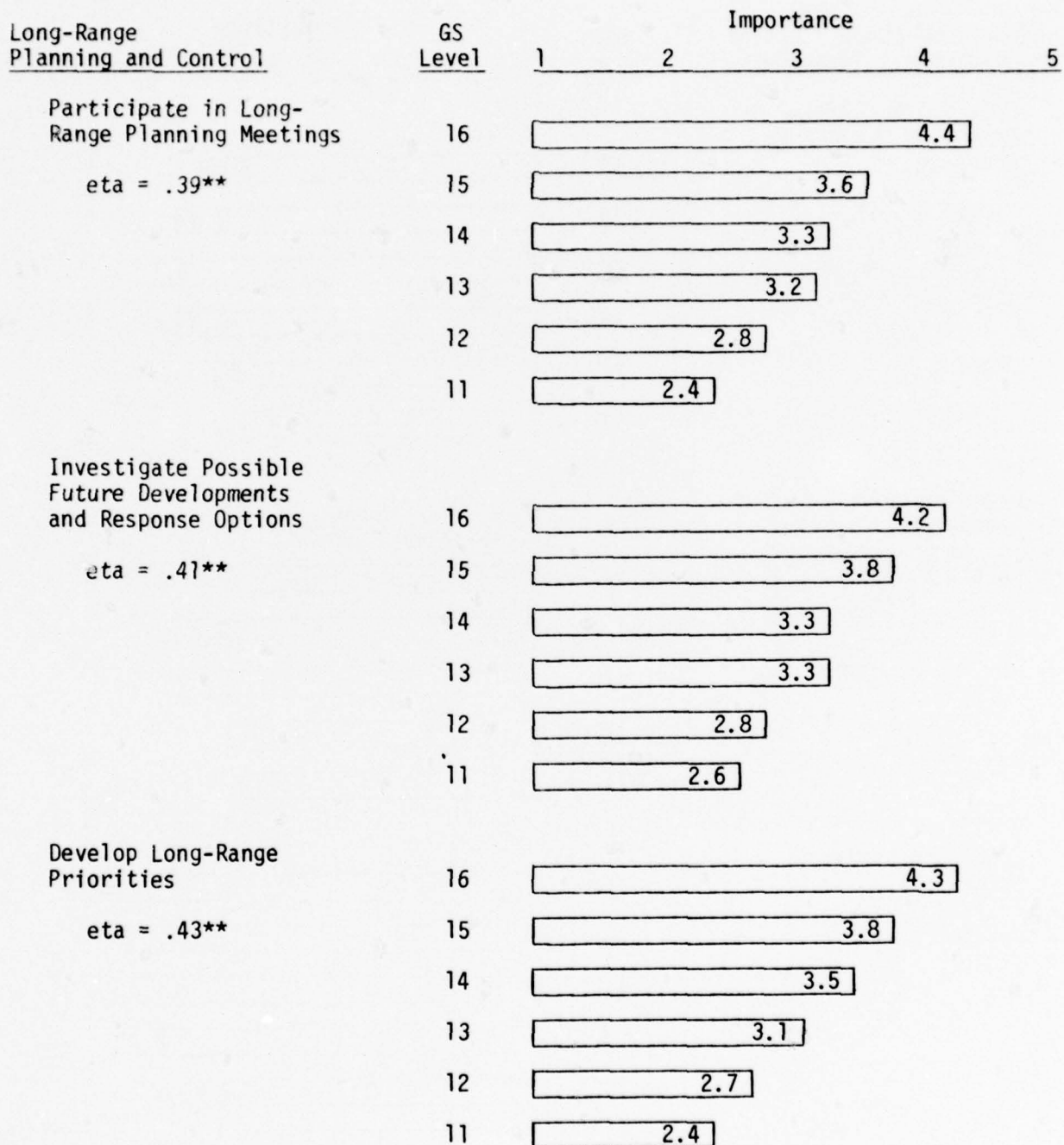


Figure 9. Rated Importance of Long-Range Planning and Control Activities by GS Level (**p < .01)

highly related to managerial level. Each activity clearly became more important as an individual moved up the managerial ladder. For example, "participate in long-range planning meetings" was rated as only 2.4 in importance by the GS 11s, but for the GS 16s a rating of 4.4 was obtained. These results clearly support the position that forecasting and other long-range planning and coordination activities are crucial for higher level positions and should be a critical job requirement in the selection process to these positions.

The other activities in this category were also viewed as more important by higher level personnel. The activity, "develop long-range priorities," was rated only 2.4 by the GS 11s, but 4.2 by the GS 16s. Despite the high degree of importance attached to these activities, however, the time spent on these kinds of activities was less than 15 percent by all GS levels, including the GS 16s. Other activities, although rated lower in importance, consumed more time of the top managers.

Job Assignment Analyses

On the front of the JAD form, each respondent was asked to list his/her current job title (civil engineer, electrical engineer, structural engineer, economist, etc.), his/her divisional assignment (engineering, planning, construction, etc.), and whether he/she worked in the area of Civil Works or Military Construction. The respondents were grouped into these various categories and their responses to the JAD analyzed to determine if there were significant differences in the amount of time spent and the importance of the job characteristics.

These analyses were performed because interview results with Corps personnel indicated controversies about prerequisites, advantages, and limitations of various cross training assignments. The results of the current study revealed that, on the measures studied, the job title, the divisional assignment, and whether the respondent was involved in civil or military works were not differentiating factors. In the construction of the instrument, the categories and job activities were not selected to assess the specific content or the process characteristics of the job classifications, and the results indicated that the time categories and the specific activities were not sensitive to these kinds of job differences.

Stated alternately, the results did not display content and/or process aspects of jobs that need to be considered in certain promotion or job rotation assignments. Positions at similar levels within the Corps do have many managerial activities that are similar in amount of time spent and in importance. Positions at different managerial levels (GS 11 versus GS 15, for example), however, are different in the amount of time spent and in the importance of specific activities.

Job Activity Categories for GS 15s and 16s

In this section of the report, a special analysis of the total group of the GS 15s (N = 162) and 16s (N = 20) who responded to the JAD will be presented. Doing so will facilitate the identification of skills necessary for performance at those levels.

In Table 4, the JAD categories are rank ordered according to the average percent of time spent on each category by the GS 15s and 16s. In the second column, the average rated importance of the JAD categories is presented. The numbers in parentheses represent the rank order of the average rated importance.

Category 5--Use Knowledge and Skills in a Technical Capacity--was the unquestionable leader in percent of time spent for the GS 15s and 16s--20.1 percent. The next three categories are grouped rather closely together--14.1 to 14.3 percent. Then there is another sizable drop, and the last five categories are within a range of 1-percentage point.

The average rated importance column of Table 4 also presents some interesting findings. The relationship between average rated importance and percent of time spent was not high, which was an indication that the priorities of the GS 15s and 16s were not well reflected in the amount of effort expended. The category with the highest average rated importance--Interpersonal Interaction--was one in which professional engineers typically have received little formal training. This category has been previously identified as one in which opportunities for individual development should be provided, and one which should be carefully considered in the selection/promotion process.

The second and third most important categories--Interact with Other Organizations, and Train and Motivate Personnel--are also definitely managerial in nature. These findings reinforce the idea that the best engineers may not be most qualified to be selected for the higher GS level positions.

These results with the JAD highlight the importance of careful analysis of each job opening prior to the selection process. After this analysis, the individuals who have the best ability to function in the various activities of the higher level positions should be selected. The person who wants to remain an engineer should not be encouraged to apply for higher level managerial positions. Other methods for recognizing the talents of the engineer should be considered, such as divisional positions which may be more in line with their capabilities, rather than placing them in a managerial slot which may not match up with their abilities and interests. Contraindicated placements could be detrimental to the individual, subordinate employees, and the Corps.

Table 4

Analysis of Job Activity Categories by Time Spent, and Average Rated Importance for GS Levels 15 and 16 (N = 182)

<u>Category</u>	<u>Percent of Time</u>	<u>Average Rated Importance*</u>
5. Use Knowledge and Skills in a Technical Capacity	20.1	3.57 (6)
7. Interact with Other Organizations	14.3	3.85 (2)
6. Interpersonal Interaction	14.1	4.00 (1)
1. Review and Evaluate Projects	14.1	3.34 (8)
4. Initiate Improvements in Methods and Operations	10.9	3.52 (7)
9. Long-Range Planning and Control	10.3	3.80 (4)
3. Train and Motivate Personnel	10.2	3.83 (3)
2. Allocate Resources	10.2	3.30 (9)
8. Schedule Work of Organizational Components	10.1	3.73 (5)

* Numbers in parentheses represent rank order for rated importance.

The following basic issues are evident from these results:

1. The personnel at the higher managerial levels within the Corps generally cannot be specialists and function well. They must have abilities across all the categories investigated. If a person wishes to spend his/her time primarily in a given specialty area, then that person should usually not seek a managerial position.

2. The evidence suggests that even the GS 15s and 16s may still think of themselves as engineers first, and managers second. This is reflected in the high percent of time spent on Category 5. The wisdom of the 15s and 15s spending this disproportionate amount of time on a category that is ranked 6th in importance appears questionable.

4 DISCUSSION

The purpose of this study was to examine the nature of job activities for U. S. Army Corps of Engineers engineering personnel. Knowledge of the relative importance of different job activities at various higher management levels in the Corps would be helpful in the selection/promotion process. To determine the relative importance of the various job activities, most of the GS 15s and 16s in the Corps of Engineers, and a selected sample of GS 11s, 12s, 13s, and 14s were asked to respond to the Job Activities Description--a relatively brief instrument for collecting information about the characteristics of managerial jobs. The JAD was focused on management practices that were generally characteristic of key positions within the Corps.

The results of the study identified substantial job duty differences among different levels of managerial positions. These results have important implications for the training and selection of managerial talent. Specifically, personnel at the journeyman level and below should have the opportunity to develop their skills in the areas that are particularly important for successful performance at the higher GS levels. By knowing the relevant skills necessary for competent performance, supervisors and ad hoc panels could evaluate the relative strengths and weaknesses of applicants and place them in positions which make the best use of their skills. Such placements would result in higher levels of performance and would have the additional benefit of having a generally positive impact on the work satisfaction and morale of subordinate employees.

The results presented in the previous chapter have clearly demonstrated that this approach (i.e., documenting key managerial job activities, and using this information during the selection process) can be used by the Corps of Engineers as a valid procedure. The precise methods that would be used in accomplishing this are beyond the scope of this study, and should be the subject of further research and development. The results of this study confirm the findings of previous research--that the importance of different managerial duties does vary by managerial level. The four categories that correlated the highest with managerial level in this study were: Train and Motivate Personnel, Long-Range Planning and Control, Initiate Improvements in Methods and Operations, and Allocate Resources. The activities within these categories should be used as part of the selection and training processes.

Percent of Time Spent by GS Level

The relationships between percent of time spent on each of the nine categories of the JAD and GS level can be summarized into three types, as exemplified by Figure 10. In this figure, one category (Use Knowledge

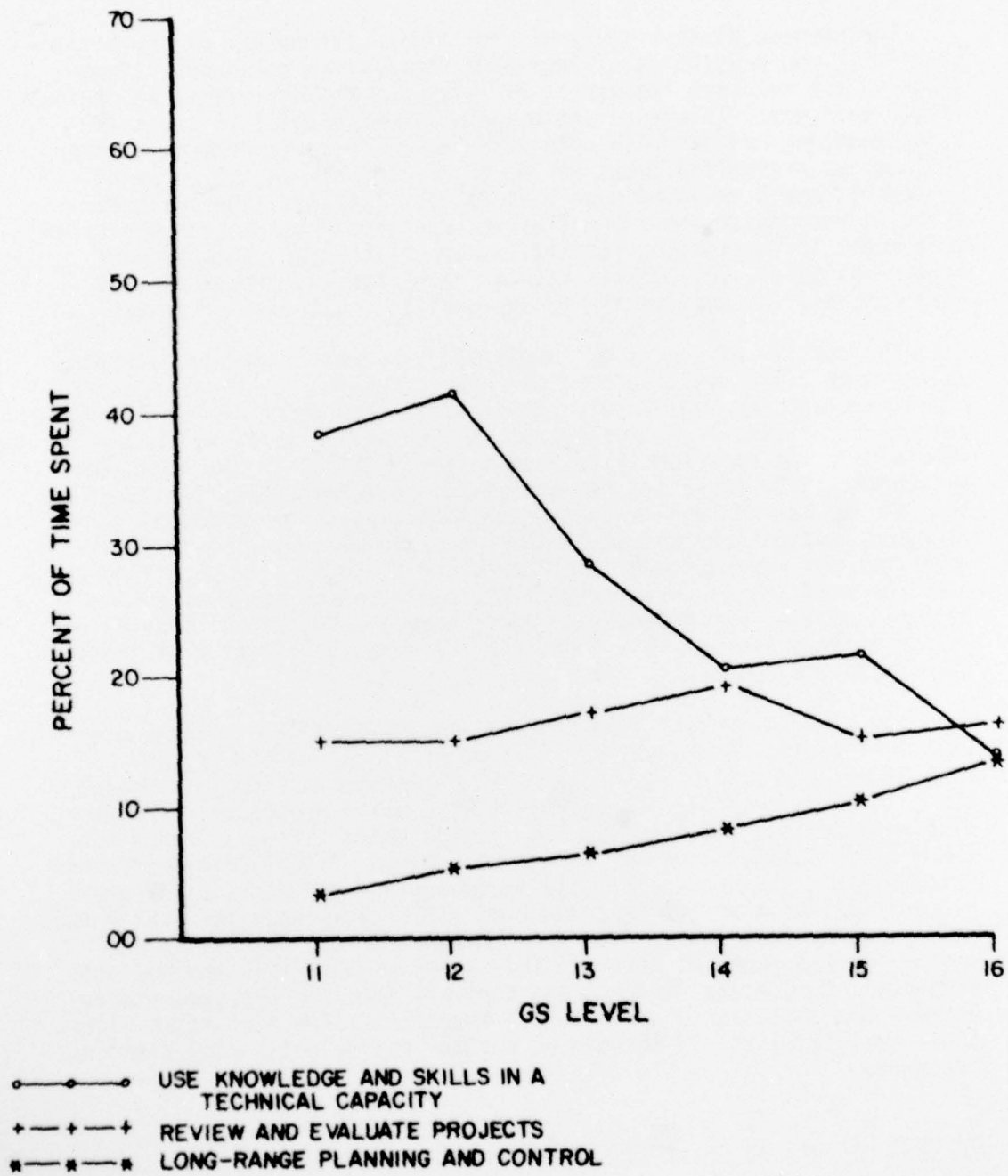


Figure 10. Percent of Time Spent on Three Example Categories of Activities by GS Level

and Skills in a Technical Capacity) begins at a high level for the lower GS levels and decreases as the GS level increases. This category deals with the skills that the engineer would learn in college, and for which the engineer was first employed by the Corps. These skills, however, decrease in usage as the engineer advances into management positions.

A second type of relationship is exemplified by the category--Review and Evaluate Projects. With this type, the amount of time spent is fairly constant across all GS levels. These, then, are skills that are needed when the engineer is hired, and remain necessary as the employee progresses up the management ladder. Other JAD categories that belong to this group include: Initiate Improvements in Methods and Operations; Interact with Other Organizations; and Schedule Work of Organizational Components.

The third type of relationship is exemplified by the category--Long-Range Planning and Control. Other JAD categories that belong to this group include: Allocate Resources; Train and Motivate Personnel; and Interpersonal Interaction. The amount of time spent for the categories increases as GS level increases. The categories in this group, then, could be the subject of training for the Corps employee. The typical engineer would not be expected to have developed many of the skills necessary to perform these functions effectively; experience and in-service training would be necessary to prepare the engineer to perform competently in these areas. Since the future of the Corps is, at least in part, dependent upon how well these activities are carried out, it appears crucial that these skills be systematically developed.

Importance of Activities by GS Level

The analyses of the JAD data have indicated that certain activities are of more importance to higher GS level Corps personnel. The importance of the job activities to the various GS levels is summarized in Table 5, which shows those job activities rated as very important by the personnel completing the survey. Very important was operationally defined as being rated an average of 3.9 or above on the JAD importance scale. This allows a comparison of the extent to which job activities were common across the GS levels and summarizes the increasing importance of different activities as the individual progresses up the managerial ladder. The table also illustrates a number of key issues with which this report has dealt.

For GS 11s and 12s, the only activity rated as very important was "solve various engineering and scientific problems." If the jobs of the individuals holding these positions are restricted to engineering activities, then these individuals will not have an opportunity to develop those skills which are so important for higher level positions.

Table 5

Job Activities Rated as Very Important by Different GS Levels

	GS Level					
	11	12	13	14	15	16
REVIEW AND EVALUATE PROJECTS						
Monitor Project Progress.			X	X	X	X
Evaluate Productivity Measures and Systems.						
Review Cost Accounting Records.						
ALLOCATE RESOURCES						
Budget Program Expenditures				X		
Allocate Resources to Projects and Programs				X	X	X
Prepare Cost Estimates for a Project.						
TRAIN AND MOTIVATE PERSONNEL						
Analyze Training and Developmental Needs of Subordinates.						
Guide Personnel Assignments and Procedures.					X	
Provide for Personnel Development and Recognition			X	X	X	X
INITIATE IMPROVEMENTS IN METHODS AND OPERATIONS						
Develop and/or Implement New Methods of Operation						
Plan and Initiate New Organizational Procedures						
Design New Management Procedures.						
USE KNOWLEDGE AND SKILLS IN A TECHNICAL CAPACITY						
Solve Various Engineering and Scientific Problems.	X	X	X			
Prioritize System Requirements and Objectives						X
Act as Consultant for Solving Technical Problems.			X			
INTERPERSONAL INTERACTION						
Help Others Resolve Differences				X	X	
Stimulate Cooperation Among Employees		X	X	X	X	X
Provide Feedback to Subordinates About Job Performance				X	X	
INTERACT WITH OTHER ORGANIZATIONS						
Negotiate with Outside Organizations.				X	X	
Develop Cooperative Relationships with Clients, Interest Groups, etc.			X	X	X	X
Keep Up With Current Events Through Contacts With Outsiders.						
SCHEDULE WORK OF ORGANIZATIONAL COMPONENTS						
Organize Activities of Others to Respond to Problems.				X		
Organize Work Schedules		X				
Establish Project Priorities.		X	X	X	X	X
LONG-RANGE PLANNING AND CONTROL						
Participate in Long-Range Planning Meetings						X
Investigate Possible Future Developments and Response Options.						X
Develop Long-Range Priorities						X

Equally or more important, without having an opportunity to develop those skills, they will also not have an opportunity to display them, and those skills are the very factors which should be the basis for selection to GS 13 positions.

Table 5 clearly shows that a number of new managerial duties are introduced at the GS 13 level, having been rated very important by the incumbents of that level. Moving up GS levels, the job activities of importance tend to move away from strictly engineering-oriented activities, and toward managerial functions. For example, activities in both Interpersonal Interaction and Train and Motivate Personnel were rated as very important for the first time at the GS 13 level. If GS 13 level personnel and higher have not had an opportunity to develop their talents in these new duty activities, then their performance will be less effective than it could or should be.

The table also shows that the selection of people for higher level positions should not be based only on previous job performance--this would fulfill the Peter Principle--but should rather be based on the performance of the individual on the activities that are important in the future job. The JAD form, or a variation of it, can serve as a procedure to help define the managerial activities of an open position.

By the time individuals advance to the GS 14 position, some additional activities of importance are typically added. These include: "budget program expenditures," "allocate resources to projects and programs," "help others resolve differences," "provide feedback to subordinates about job performance," "negotiate with outside organizations," and "organize activities of others to respond to problems." For the first time, "solve various engineering and scientific problems" was not rated as a very important part of the GS 14 position. The real transition away from being an engineer and toward becoming a manager has clearly begun by the time the individual reaches the GS 14 level.

By the time individuals reach the GS 16 position, job activities they rate as important have become even more varied. The activities concerned with Long-Range Planning and Control in particular were all rated as very important by the GS 16s, even though they had not been so rated by lower levels. Thus, sensitivity, awareness, and competence in these kinds of activities should be important considerations in the selection of GS 16s.

There was only one category of activity that was not rated as important by any GS level--Initiate Improvements in Methods and Operations. Since the activities in this category were concerned with organizational change, it seemed unusual that such activities were not viewed as more important, particularly if it is assumed that continuing change will characterize future development of the Corps.

There were five activities rated very important by GS 13s through GS 16s. These key activities, which are important regardless of the level of the managerial job, were:

- "monitor project progress"
- "provide for personnel development and recognition"
- "stimulate cooperation among employees"
- "develop cooperative relationships with clients, interest groups, etc."
- "establish project priorities"

These are activities with which there should be good opportunities to review an individual's performance at a given level, with the expectation that similar kinds of performance will be important at higher level positions.

Table 5 does not necessarily highlight job activities that change rapidly in importance as one proceeds up through management (i.e., those activities that have the highest eta coefficients with grade level). Although there were a number of specific activities with marked differences across grade level, those most likely to change in importance included:

- "allocate resources to projects and programs"
- "provide for personnel development and recognition"
- "develop long-range priorities"
- "investigate possible future developments and response options"
- "provide feedback to subordinates about job performance"

Further Questions

The present study, given the procedures followed and the sample studied, had no substantive limitations which bear on the validity and generalizability of the findings. The findings have clearly demonstrated the feasibility of using the JAD results and procedures to help guide selection decisions for the Corps of Engineers. The findings are generally applicable for defining the duties of GS 13s through GS 15s and, with some slight qualifications, of GS 16s. The findings for the small sample size of GS 16s were confirmed by extension of established trends from other GS levels. However, a number of unanswered questions remain concerning the implications of the research for evolving personnel policies, understanding organizational performance and change, and other issues.

The study has important implications for evolving personnel evaluation systems. The evaluation of performance should obviously emphasize the key duties for each position. The recently passed Civil Service Reform Act of 1978 is an example of how performance will be tied to important job duties for selected civil service personnel. The use of the JAD approach in contributing to personnel evaluation systems could be expanded to include other job activities and other grade levels. An expanded list of activities could be developed to pinpoint more precisely the diverse management functions.

An intriguing question that is related to the personnel evaluation issue concerns the degree of relationship between the effectiveness of a manager on the one hand and the degree to which the amount of time spent on job activities is congruent with the importance of the activities. If this congruence were more characteristic of outstanding managers, such a statistic could serve as a check for management to insure that their time is being spent appropriately.

An issue which underlies the entire project, i.e., Corps leadership and the future development of the Corps, could potentially be illuminated by a better understanding of how different organizations compare and change as a function of top management job activities. Comparative JAD data on other government and private organizations could provide important insights about organizational performance. Periodic re-administrations of the JAD would also be appropriate to maintain the validity of the findings and to further clarify how management activities and organizational change are related.

5 SUMMARY AND CONCLUSIONS

The Job Activities Description, a brief form to collect information about the importance of and time spent on various job duties, was administered to 650 U. S. Army Corps of Engineers employees at GS levels 11 through 16. The JAD focuses on management practices that were generally characteristic of key positions within the Corps. Briefly summarized, the findings of the study were as follows.

1. The study has clearly demonstrated the feasibility of using job activity descriptions to help guide selection decisions. The amount of time spent on various job activities was shown to vary by GS level. In general, higher graded personnel spend their time on many different kinds of activities which were managerially oriented and general in nature. At the lower grades, however, individuals spent most of their time in a specialist role, performing technical duties related to their specialty.
2. The importance of each of the 27 activities was also presented for the six grade levels studied. At grades 11 and 12, no management activities were rated as very important other than Use Knowledge and Skills in a Technical Capacity. At grade 13, eight activities were rated as very important; by grade 16, ten activities were so rated.
3. In addition to the general findings about the importance of and time spent on various activities across grade levels, the analysis of job classifications was not conclusive. The results did not indicate content and/or process aspects of jobs that need to be considered in certain promotion or job rotation assignments. These findings further demonstrate the feasibility of using the JAD across grade levels and job classifications.

Based on the conclusions listed above, selection should be based not only on past performance but should particularly emphasize the potential of candidates in those activities that are important in the open position. Further, individuals at all grade levels should be given opportunities to develop and display their management potential. Such opportunities should then facilitate more effective selection decisions.

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